I. I. M.

PRESS BULLETIN 456 MAY, 1933

IMPERIAL MYCOLOGICAL INST. 12 JULY 1933

UNIVERSITY OF FLORIDA
AGRICULTURAL EXPERIMENT STATION
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RHIZOCTONIOSE, A COMMON DISEASE OF PLANTS

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Rhizoctoniose is a name applied to certain diseases of a large number of plants of various ages, that are caused by the sterile, soil inhabiting fungus *Rhizoctonia solani* Kühn, the spore-bearing stage of which is *Corticium vagum* B. & C.

Rhizoctoniose is a widespread disease in Florida, occurring on sandy, clay, marl and muck soils. It is more or less common on both dry and wet lands, varying considerably from season to season. One year it may be most destructive in dry sandy fields and the following year it may cause no damage to crops growing there but may cause serious losses on the wet hammock lands. All cultivated soils of Florida are more or less infested by this fungus and crop losses caused by it probably depend mainly upon moisture and temperature relationships. All told, the losses caused by the disease are enormous because of its destructive nature and the large variety of plants attacked. It damages plants in Florida throughout the entire year and is particularly important in the vegetable-growing areas during the winter and early spring-growing period.

The fungus lives in the soil or on dead plant refuse from season to season when there are no plants growing in the fields. It readily survives in the soil through all adverse conditions except for extensive periods of flooding by water. The spores and particles of the fungus and diseased plants or parts of plants are carried from field to field or to different parts of a field by wind, drainage water and cultivation. The fungus is very persistent and survives extremely unfavorable conditions. It produces numerous brownish, irregular bodies called sclerotia which are compact masses of the mycelium of the fungus. These sclerotia may remain inactive for a year or two during adverse conditions and then germinate, producing the living fungus. The fungus also produces spores in abundance under favorable conditions, which may be of considerable importance in spreading the parasite, particularly in newly cultivated fields.

Damp-off and seedling diseases caused by this fungus are encountered in all parts of the state. Damp-off is characterized by the weakening of the stems of seedlings at the soil line soon after they emerge from the soil. Most seedlings are prostrated before wilting appears, although certain ones become slightly wilted when first attacked. The tips of the cotyledons droop and often hang from the stem in a flaccid condition before the entire plant falls over. This is particularly true with cucumber seedlings. Damp-off develops in more or less circular spots in seedbeds that are sown broadcast. This is often the case with celery, lettuce, beets, etc. Seedlings growing in rows in seedbeds show the disease in portions of the rows. Where the rows are several inches apart, the disease is not

found usually in adjacent rows, unless the infection is quite general in the whole bed, or until it has spread extensively in the row.

Seedlings of certain vegetable crops and flowering annuals remain succulent and tender for longer periods than others and consequently suffer greater losses. When the disease occurs in seedbeds of this kind of seedlings, it kills all of them in its path. Certain seedlings harden rapidly and for this reason some of them may be able to survive the first attack of the fungus. Certain environmental conditions unfavorable for the development of the disease may appear at any time and retard its rapid progress or prevent it entirely. Cabbage seedlings very often withstand the early infection but usually develop wirestem later. Sweetpea seedlings may be killed shortly after emerging or they may continue to grow until flowering buds are visible before dying. Under conditions favorable for the development of the fungus, citrus seedlings often are killed, although they usually withstand the attacks of the fungus because of their woody nature.

Root, crown and stem lesions are found on susceptible plants during various stages of their development. Only one part of the plant may show the disease or occasionally several parts show it. A tomato seedling may be killed from damp-off or, when older, only the roots and crown may show the disease or the stem and branches may be killed after they begin to bear fruit. Bean plants are particularly susceptible and may be killed at any time from the seedling stage to maturity. They usually show brownish stem lesions below the soil line and the stems are often hollow. Similar spots also occur on potato sprouts about the time they emerge. The roots of strawberries, gladioli and celery often show brown diseased areas caused by this fungus. Plants may be attacked at the crown, as are numerous biennials or perennials, and killed. The disease is probably the most important cause of failure in Florida of certain introduced biennial or perennial ornamentals. Occasionally the disease girdles the stems of bushy and creeping plants where they contact the soil. This is particularly true of tomatoes, ground cherries, verbenas and petunias. It often grows on the leafy portions of other plants such as lettuce, cabbage, turnips, and pansies wherever they touch the soil and in most cases eventually kills the plant.

Decay of tomatoes, squashes, beans, peppers, cucumbers, and eggplants encountered in the field and garden is often the result of this fungus invading the product where it comes in contact with the soil. A single infected fruit packed and shipped with healthy ones may cause the loss of the entire hamper or crate in transit. Paper wrappers do not keep the fungus from spreading. It will attack sound fruits almost as readily as injured ones.

Control of Rhizoctoniose in Florida is extremely difficult because of its wide distribution, its parasitic and saprophytic phases, its resistance to unfavorable conditions, the large variety of plants attacked, the various stages of the plant growth attacked, its development throughout the year and the expense of applying thorough methods.

Except in the case of white potatoes, rhizoctoniose is not extensively seed-borne. Potatoes free of the disease should be planted. Soil used for seedbed purposes should be thoroughly disinfected by steam, formaldehyde or Semesan. (See Press Bulletin 423). An application of liquid Semesan, 1 pound to 48 gallons of water, 1 ounce to 3 gallons of water or 1 level teaspoonful to 1½ quarts of water, should be made to the seedlings a day or two after emergence when still in the cotyledon stage. Diseased areas in seedbeds should be wet with a 1-50 formaldehyde solution and the top two inches of soil removed immediately from the seedbed. Do not transplant seedlings from diseased portions of the seedbed to the field. Plow under all plant refuse as soon as the crop is removed. Remove unsalable fruits from the field and practice sanitation whenever possible. Rotate the crops so that susceptible crop plants do not follow each other season after season. Develop adequate drainage for the land. Irrigate more thoroughly and less frequently. Give covered seedbeds all the ventilation possible.